PRETRAINING CORRELATES OF TRAINFIRE MARKSMANSHIP

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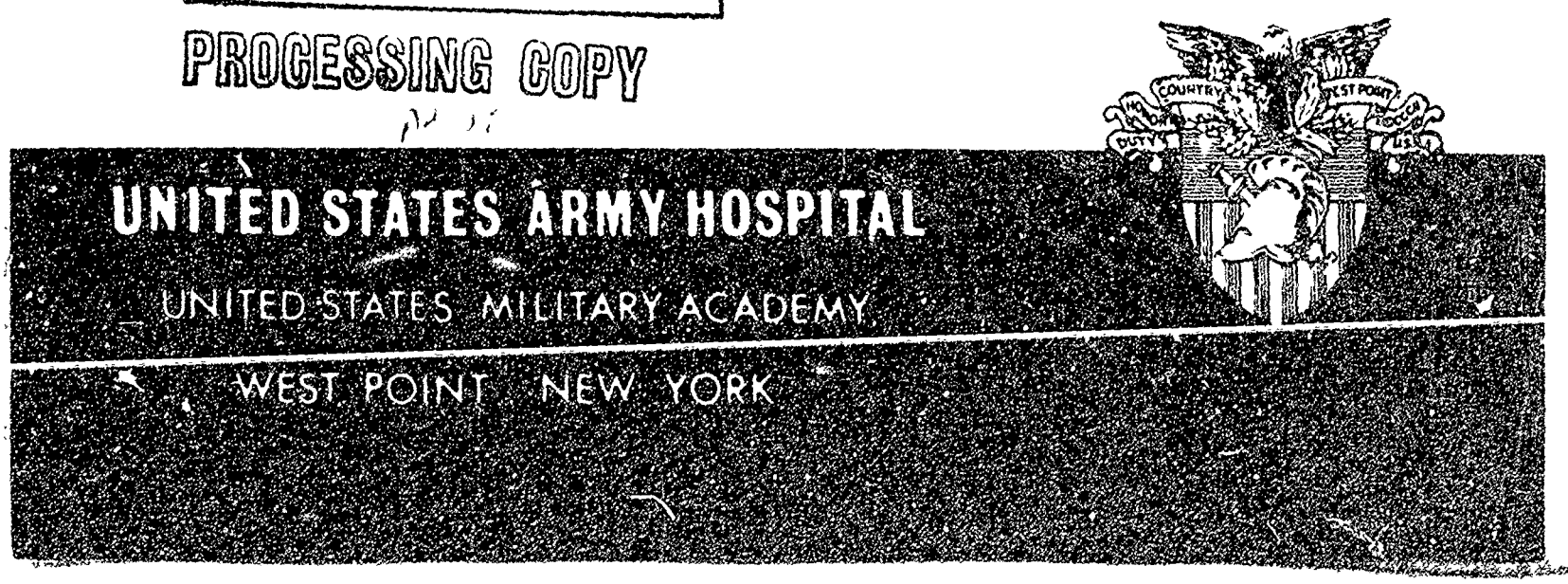

PRETRAINING CORRELATES OF TRAINFIRE MARKSMANSHIP

ABSTRACT

Entering USMA cadets of the Class of 1967 were studied to determine whether prior weapons experience, intelligence, or their parents' or their own attitudes toward weapons influenced their subsequent rifle firing scores in a "Trainfire" marksmanship course.

On a questionnaire administered shortly after arrival at West Point, 59 per cent reported they had fired at least 250 shots previously, and 40 per cent had a prior course of instruction. Virtually all (98 per cent) expressed a liking for weapons, and 73 per cent reported they expected to fire in the upper half of their class. Most (82 per cent) reported their fathers as either in favor of, or not objecting to, their use of firearms, and 43 per cent reported their fathers had bought them weapons. Mothers were less encouraging than fathers regarding owning and using firearms; however, 71 per cent of the subjects described their mothers as either encouraging or not objecting to their learning to fire weapons.

A cadet's expressed confidence in his firing ability was found to be a limited, yet the best, single predictor of his range firing scores. Although items concerning prior firing experience, and items concerning cadet and parental attitudes toward weapons, were also correlated with the criteria of range firing scores, they did not add substantially to the predictive ability of the confidence item. The correlations of experience with range scores were lower than in previously reported studies. Intelligence, which was correlated with marksmanship scores of Army basic trainees, was not found to be an effective predictor in this cadet population. While whether or not a subject had qualified previously was not generally related to his range score, those few individuals who had scored as Distinguished Riflemen or Experts in Junior NRA fired significantly better than the remainder of the group.

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A. INTRODUCTION

In the course of a study of "Rifle Performance Under Conditions of Stress" (Research Proposal Number 3, 1963), information was obtained concerning New Cadets' intelligence, prior experience in the use of firearms, attitudes toward weapons, and parents' attitudes and behavior relative to owning and using firearms. This information was collected in order to determine whether, in considering effects of stress on rifle performance, it was necessary to control for individual differences in intelligence, attitudes, and experience.

Previous research concerning the prediction of rifle marksmanship from pretraining data (Humphreys, 1936; McGuigan, 1955; Spaeth, 1921) considered the effects of a variety of variables on rifle performance, e.g. rifle steadiness, firing experience, educational level, intelligence, mechanical aptitude, and mechanical information. However, a recent study by McCaslin and McGuigan (1955) suggested that of all of these variables, intelligence and experience were the most important, and that the remaining variables associated with rifle marksmanship were correlated with intelligence.

It should be noted that these previous studies were conducted on known-distance and fixed-target ranges, whereas the present study was conducted on a "Trainfire" range with electronically controlled "pop-up" targets appearing at varied distances. Nevertheless, it was hypothesized that in this study, also, experience would be an important pretraining predictor of rifle marksmanship. However, since the range of intelligence of cadets is much more restricted than the range for the Army basic trainee subjects of the previous research, intellectual aptitude was not expected to be such an important predictor in the present group. Instead, it was felt that attitudes toward the use of firearms might

become an important aspect of prediction under these circumstances. Therefore, information concerning subjects' and their parents' attitudes toward owning and firing weapons was obtained.

B. METHOD

Subjects were 514 members of the Class of 1967 for whom a complete set of predictor and range firing scores were available. Shortly after arriving at West Point, the class was administered a questionnaire concerning their experience with firearms, their present and past attitudes toward weapons, and their parents' attitudes toward their owning and using weapons. In addition, Scholastic Aptitude Test Verbal scores were obtained as a measure of general intellectual aptitude.

Two criteria of firing performance were used, both of which were obtained approximately four weeks after the questionnaire was administered and during the subjects' initial military training period at West Point. The first was a practice score (Field Firing I) obtained from a count of the number of hits in one hundred shots obtained while firing at known-distance "pop-up" targets from several firing positions. The targets remained up for only a few seconds; if a subject failed to fire in the allotted time, it was scored the same as if he had fired and missed.

The second performance score, Record Firing, was obtained on a different range the following day. In this exercise a subject once again fired at electronically controlled targets which were visible for only a few seconds.

C. RESULTS

1. Distribution of Responses to Questionnaire Items

a. Prior Firing Experience. The following summary of responses provides an indication of the extent of prior experience reported by members of the class:

(1). How many times have you fired a weapon (pistol, rifle, shotgun)?

Number of Shots	Percentage of Class
Fewer than 50	17.2
50-100	11.2
101-250	12.5
More than 250	59.1
	100.0

(2) Have you taken a regular course of instruction in firing the rifle?

	Percentage of Class
Yes	40.2
No	58.8
No answer	1.0
	100.0

(3) Have you previously fired the rifle for qualification?

	Percentage of Class
Yes	29.0
No	70.5
No answer	.5
	100.0

(4) If you <u>have</u> previously fired the rifle for qualification, check highest level attained:

	Percentage of Respondents
Failed to qualify	7.3
Scored marksman	31.9
Scored sharpshooter	36.2
Scored expert	24.6
	100.0

(5) Have you ever participated in a Junior NRA (National Rifle Association) program?

	Percentage of Class
Yes	18.4
No	81.6
	100.0

(6) If you have participated in a Junior NRA program, check highest level attained:

	Percentage of Respondents
Did not qualify	5.4
Pro-marksman	6.8
Marksman	21.8
Marksman 1st Class	10.9
Sharpshooter	41.5
Expert	12.2
Distinguished rifleman	1.4
	100.0

(7) Have you ever been on a pistol or rifle team?

	Percentage of Class
Yes	7.8
No	88.1
No answer	4.1
	100.0

b. Attitudes Toward Firing. The following summary of responses provides information concerning subjects' attitudes toward weapons.

(1) If your entire class were to fire for qualification tomorrow, how would you expect to score?

	Percentage of Class
In the highest 1/6	15.4
In the second 1/6	27.3
In the third 1/6	30.9
In the fourth 1/6	15.1
In the fifth 1/6	7.3
In the lowest 1/6	3.9
No answer	.1
	100.0

(2) In general, my feeling toward the firing of weapons is one of:

	Percentage of Class
Strong like	54.9
Moderate like	34.0
Mild like	9.3
Mild dislike	1.1
Moderate dislike	.2
Strong dislike	.1
No answer	.4
	100.0

(3) When you were a child, did you want to own a BB gun?

	Percentage of Class
Yes	90.9
No	8.8
No answer	.3
	100.0

(4) When you were an adolescent, did you want to own a firearm?

	Percentage of Class
Yes	79.6
No	20.1
No answer	.3
	100.0

c. Parental Attitudes Toward Weapons. The class responded to questions concerning their parents' attitudes toward weapons as follows:

(1) Check whichever of the following was true regarding your father:

	Percentage of Class
Bought me a rifle, shotgun or pistol	43.2
Approved my purchasing such a weapon	16.7
Did not approve my owning any weapon except a BB gun	13.2
Did not approve my owning any weapon, including a BB gun	16.0
No answer	10.9
	100.0

(2) Check whichever of the following was true regarding your mother:

	Percentage of Class
Bought me a rifle, shotgun, or pistol	14.4
Approved my purchasing such a weapon	28.9
Did not approve my owning any weapon except a BB gun	18.0
Did not approve my owning any weapon, including a BB gun	23.7
No answer	15.0
	100.0

(3) Check whichever of the following was true regarding your father:

	Percentage of Class
Encouraged me to learn to shoot firearms	47.4
Did not object to my learning to shoot firearms	34.7
Preferred I did not shoot firearms, but did not object to my shooting a BB gun	6.9
Did not approve my firing any weapon, including a BB gun	6.3
No answer	4.4
	100.0

(4) Check whichever was true regarding your mother:

	Percentage of Class
Encouraged me to learn to shoot firearms	20.3
Did not object to my learning to shoot firearms	51.1
Preferred I did not shoot firearms, but did not object to my shooting a BB gun	10.5
Did not approve my firing any weapon, including a BB gun	11.6
No answer	6.5
	100.0

d. Summary of Questionnaire data. The majority of the class (59.1%) had fired weapons at least 250 times prior to coming to the Academy, and 40% had already experienced some course in rifle instruction. Less than one cadet in five (18.4%) had participated in a Junior NRA program, and only 7.8 reported they had been on a rifle or pistol team.

Seventy-three per cent reported they expected to fire in the upper half of their class, and virtually all (98.2%) expressed some degree of liking for firing weapons. They reported their fathers overwhelmingly (82.4%) as either in favor of or as not objecting to their use of firearms, and 43.2% of the fathers reportedly bought their sons a rifle, pistol, or shotgun. Mothers were less encouraging than fathers concerning their sons' owning and using firearms, yet

the majority (71.4%) were reported as either encouraging or as not objecting to their sons learning to shoot firearms.

2. Relationships Among Predictors and Firing Performance

Table 1 presents the intercorrelations among the questionnaire items, SAT Verbal Scores, and the range firing scores.

Table 1

Intercorrelations Among Questionnaire Items, SAT Verbal, and Range Firing Scores (N=514)

	Record Firing	* +or-250 Shots	* Prev.Instruction	* Prev.Qualification	Prediction of Score	Feelings re: Weapons	* Wanted BB Gun	* Wanted Firearms	Mother re: Owning	Father re: Owning	Mother re: Using	Father re: Using	SAT Verbal
Range Scores													
Field Firing	49	15	11	09	22	11	04	15	02	07	02	09	04
Record Firing		14	05	04	24	08	08	16	15	14	11	17	-01
Experience													
* +or-250 shots			52	40	39	40	29	66	36	48	28	43	06
* Prev.Instruction				80	27	19	02	26	09	13	12	17	08
* Prev.Qualification					18	14	-06	16	07	08	08	13	01
Subjects' Attitudes													
Prediction of Score						04	07	19	42	46	42	51	03
Feelings re: weapons							45	54	13	01	14	03	02
* Wanted BB Gun								60	05	-02	14	07	00
* Wanted Firearms									20	33	06	20	03
Parental Attitudes													
Mother re: Owning										83	69	61	03
Father re: Owning											56	72	05
Mother re: Using												75	05
Father re: Using													10

Note: Underlined entries are significant at least at the .05 level.
Asterisked variables are dichotomous. In estimating the correlation between dichotomous variables, tetrachoric correlations were computed. For correlating dichotomous variables with continuous variables, biserial r's were calculated.
The remainder of the entries are product-moment r's

The moderate correlation between the Field Firing (practice) and Record Firing criteria (r = .49) indicates that doing well or poorly in the practice session was not as powerful a determiner of performance in firing for record the following day as might have been expected. Previous studies have indicated reliability coefficients (stability) of rifle scores ranging from .81 to .88 for repetitions over the same course using known-distance targets (McGuigan, 1955). Several of the predictors were reliably related to the firing scores, but none of these relationships were high. The cadet's own prediction of his performance (confidence) had the highest correlation with the two firing scores, correlating .22 with Field Firing and .24 with Record Firing. The desire to own firearms as an adolescent, reported parents' attitudes toward using and owning weapons, and previous experience in terms of sheer number of shots fired, correlated between .11 and .17 with Record Firing. Prior firing experience related generally much less to the subsequent range firing scores than was reported in previous studies using known-distance ranges. While previous qualification (whether or not a cadet had succeeded in a rifle qualification course) was not consistently correlated with firing scores, those few individuals who had qualified as Distinguished Riflemen or Expert in Junior NRA scored higher on the trainfire range than the remainder of the group (t = 2.18, $p < .05$). As had been tentatively expected for the cadet population, general intellectual aptitude (as measured by SAT verbal) was not related to "trainfire" type range scores or to any of the experience or attitudinal items on the questionnaire.

A number of substantial and interesting intercorrelations among the questionnaire items merit comment. It is not unreasonable to find that the highest intercorrelations in Table 1 are among the parental attitude items. It would have been surprising if the parent who was in favor of his son owning a weapon had not also encouraged him to use it, and the correlations support such expectations (r's = .69 to .72). The substantial correlations (.56 to .83) found between the attitudes of fathers and mothers indicate that cadets reported

considerable consistency in the views and behavior of their parents concerning firearms. Another group of interesting intercorrelations are the several moderately strong ones among past experience (number of shots fired), parent attitudes, and confidence (cadets' predictions of scores). These correlations range from .28 between number of shots fired and reported mother's attitude toward the use of weapons to .51 between the confidence measure and father's attitude toward using weapons.

Since each of these intercorrelated predictors were correlated to some extent with record firing scores, multiple correlational techniques were used to determine whether the parent attitude items and the confidence item could predict better in combination than singly, and to determine which items were the most powerful predictors. The confidence item and experience (number of shots fired) were also used in combination. Neither multiple correlation reached .25, so that the single correlation of .24 between confidence alone and record firing was not measurably improved by adding the parent attitude or experience variables.

D. DISCUSSION

In attempting to discover some of the antecedent factors helping to account for variations in trainfire rifle scores of New Cadets, it was found that several cadet and parent attitude items, as well as amount of past experience with firearms, were related to these rifle scores. However, certain problems arise in integrating these findings with results of past studies.

For example, amount of experience with weapons, as indicated by the questionnaire, was considerably less predictive of rifle scores in this population than had been found for other groups on known-distance ranges (McCaslin, 1955). This discrepancy is perhaps attributable, at least in part, to the greater complexity of firing on a trainfire range with "pop-up" targets at varying locations. It may also be partly attributable to possible differences of cadets relative to other groups in regard to factors such as range of experience,

intelligence, interest, or motivation to exceed. As has been suggested, intellectual aptitude as measured here may have been ineffectual as a predictor because of the more restricted and higher range among cadets compared with subjects of other studies. It would be of interest to determine whether confidence would likewise be a relevant factor in non-cadet groups where intelligence and experience have been found to be the principal correlates of rifle marksmanship.

Among the more interesting findings were the relationships of experience, parent attitudes toward weapons, and confidence in ability with the criteria and with each other. Cadets who reported their parents as being favorably disposed toward owning and using weapons tended to gain more experience with weapons, to be more confident of their firing ability, and to achieve higher record firing scores. However, favorable parental attitudes were not found to be related to a greater liking for weapons.

It must be kept in mind that none of the predictors, including confidence, had even moderately strong correlations with the firing criteria. Such limited validity may be partially a result of the often limited reliability of single questionnaire items. It may also be related to situational factors and the probably limited reliability of the rifle score criteria; their limited reliability is illustrated by the fact that the correlation between Field Firing and Record Firing is only .49. Factors specific to the range situation, such as rapid early learning by cadets inexperienced with weapons, weather changes within and between days, differences in firing lane difficulty, intercompany differences in physical condition and alertness associated with training schedule sequence, differences in competence and interest of coaches, and so forth, may have acted to lower the reliability of the firing scores and thereby place a ceiling on how well an item could predict these scores.

The correlations of the predictors with the criteria of range firing scores were recalculated, controlling for effects of firing order. This procedure

presumably controlled for factors associated with day and time of day, such as weather change, and intercompany differences. The recalculation, however, revealed no pattern of increase in the validities of the questionnaire items, and it would seem that a more exhaustive study would be necessary to sort out most of the possible contributors to the sources of variations in cadet rifle scores.

Of the few cadets who had achieved high levels of skill in Junior NRA, most also fired well on the Trainfire range; however, the overall pretraining measures used in this study had limited predictive ability. It does not appear, therefore, that range firing is simply a measurement of previously acquired skill and achievement, as reported by cadets, but rather may depend largely on the rifle training program at West Point.

For further study, a practical set of questions concerns the extent to which confidence of cadets in their firing ability is modified, or is modifiable, in the course of training, and whether increase in confidence as a result of training results in improved rifle performance. It may be that measurable confidence in one's ability is associated with other kinds of performance.

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